

INDUSTRIAL AND MUNICIPAL WASTEWATER TREATMENT PLANT

IMR E&T S.r.l.

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Water crisis - Wastewater challenge

Water is crucial for all aspects of our life and for the future of our planet

The world is facing a water *quality* and *quantity* crisis caused by population growth, industrialization, food production and poor water use strategies.

Wastewater pollution has the potential to contaminate scarce water resources

The contamination of freshwater and coastal ecosystems compromise the access to safe drinking and bathing water, threatening food security, providing a major health and environmental management challenge.



Water & Development

Improve wastewater management and preserve water quality is essential for a sustainable development

Growth of industries on local markets is influenced by the quality and availability of water.

Aside from the use for human and production needs, water quality contributes to improve social wellbeing.

The protection of water resources means also the protection of wildlife, habitats and ecosystems.

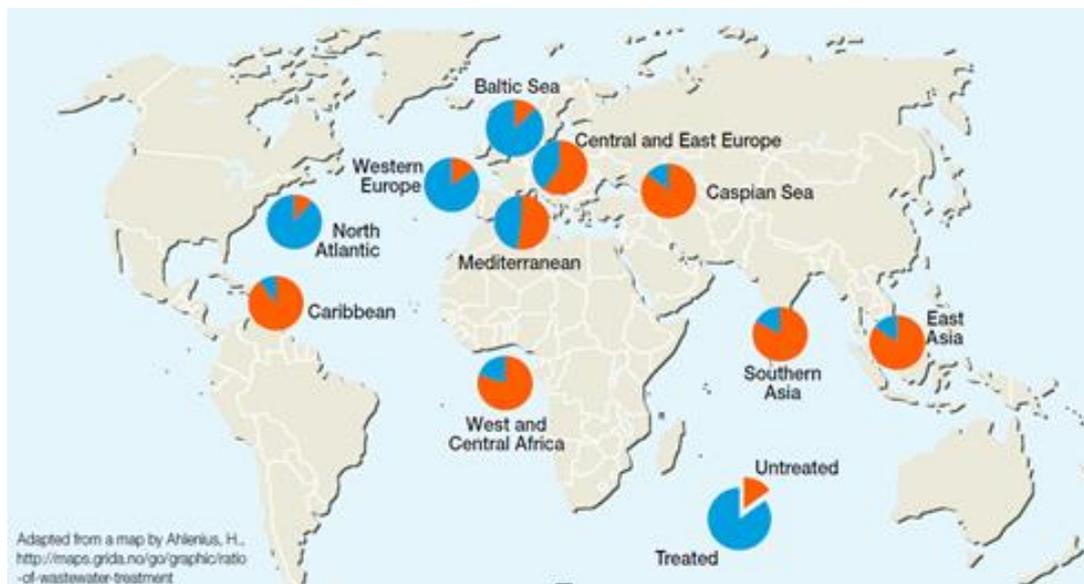
Effective strategies to manage wastewater provide opportunities to combine resources conservation, creation of economic opportunities and promotion of health practices.

Quantifying the problem

70-90% of fresh water used for food production, returning to the system contaminated

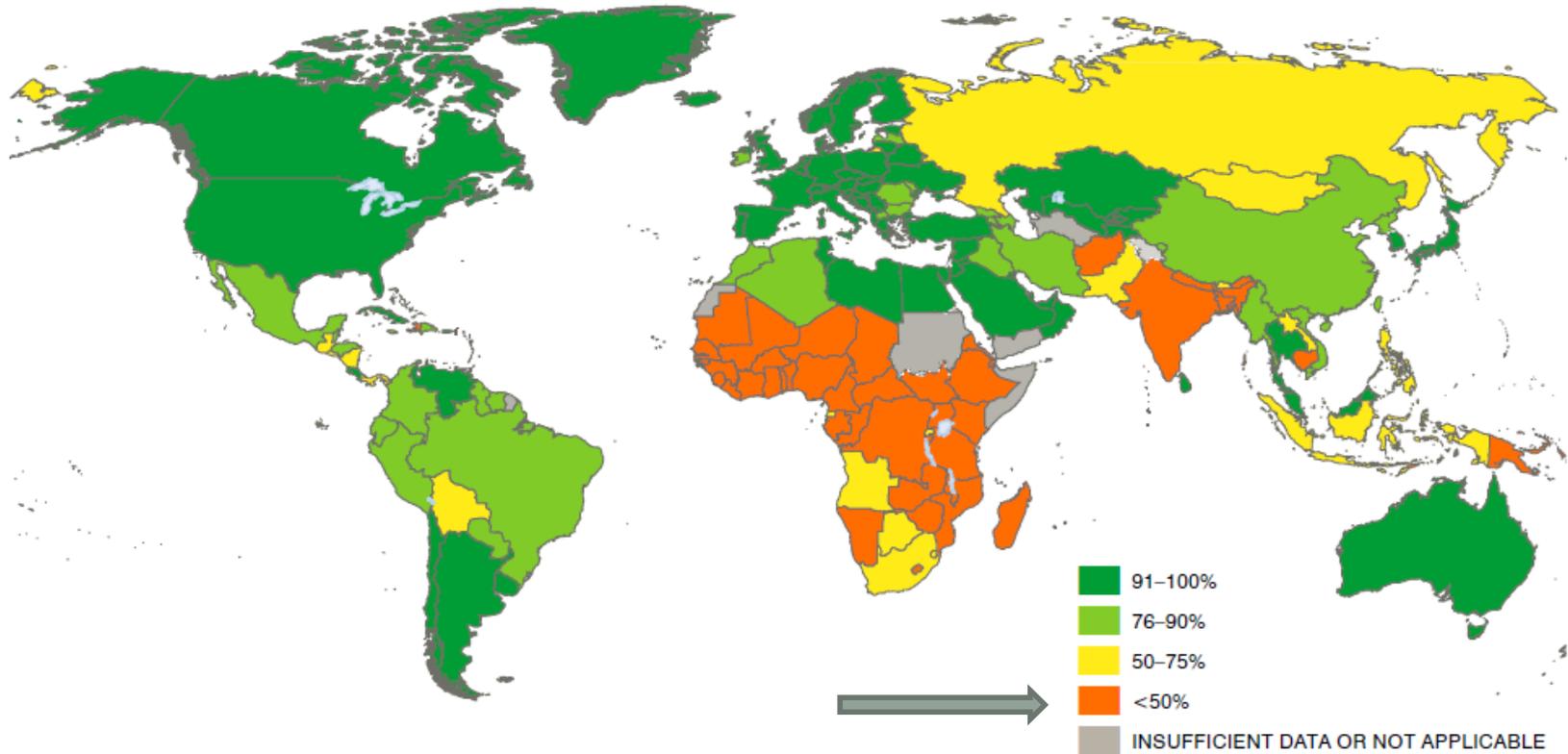
80% of wastewaters from human settlements and industrial sources are discharged without being treated

Amount of treated and untreated wastewater discharged to water bodies



In developing countries wastewater is mainly discharged untreated directly into rivers, lakes or the oceans

In 47 countries, areas or territories, less than half the population uses improved sanitation facilities



2.4 billion people, mainly in Southern Asia, Eastern Asia and sub-Saharan Africa, without flush toilets and sewage systems



Wastewater & Health

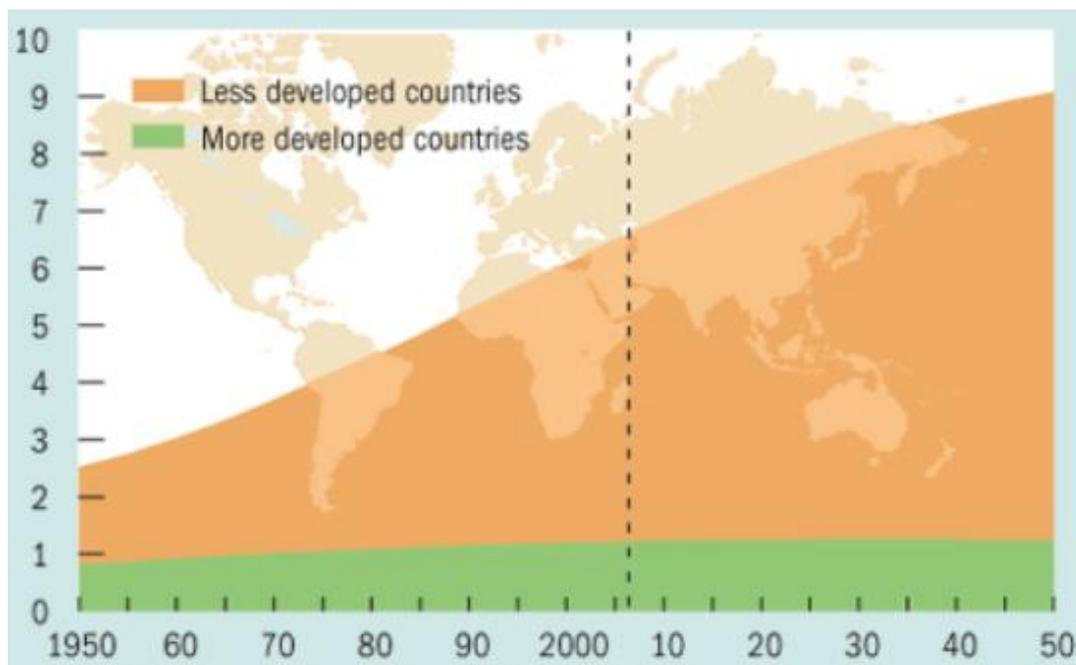
Polluted water from inadequate wastewater management is one of the greatest health challenges

Humans are exposed to pathogenic organisms through direct or indirect contact.

Common diseases are associated with exposure to polluted bathing waters, and consumption of contaminated drinking water and food.

Over half of the world's hospital beds are occupied by people suffering from water related diseases

What's the future?



The impact continue to grow

In 2025 global population will exceed 9 billions

Water demand grows twice then population growth

Major growth in developing countries that already have inadequate wastewater infrastructures.

Increase of population - increase the demand for food.

Wastewater a precious resource

The management of wastewater is linked to the management of the entire water chain. Using appropriate technologies it is possible to recycle water and satisfy most water demands.

Reuse:

- Agricultural
- Urban
- Environmental
- Industrial



Wastewater treatment: our solution

IMR E&T design plants for the biological treatment of industrial and municipal wastewater

Reliable results combining simple process and energy efficiency



Municipal plant of Calvorde, (Germany) 8000 m³/day



The purification

Activated sludge process which implement the **Sequencing Batch Reactor (SBR)** technology

The microorganisms of the activated sludge operating in both

AEROBIC and ANAEROBIC condition

perform the biological degradation of the organic matter and removal of nutrients.

Vertical closed bioreactor



- Suitable conditions enhance microbiological activities
- Automatic control system regulates operative parameters to foster metabolic pathways

High purification rate and optimization of energy consumption

The aeration

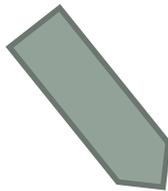
A **submersible aerator** installed at the bottom of the reactor, allows the mixing of the wastewater with the activated sludge, and introduces the oxygen necessary for aerobic degradation process.

Due to the vertical development of the reactor, compared to a traditional basin, retention time is strongly increased and the degree of utilization of O₂ is maximized

The structure: the efficiency and the cost

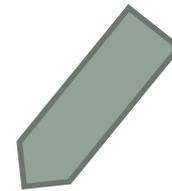
The vertical structure leads to an optimization of oxygen availability

Increasing the degree of O_2 utilization, the turbine operating time is decreased.



Minimizing Electrical consumption &

In condition of minimum O_2 *availability* the conversion of organic pollutants to water and gas, is supported, reducing the production of sludge.



Sludge disposal operations

Management costs are kept a minimum

Flexible

Working in a time rather than in a space sequence

leads to an ability to compensate peak loads, variable flows are treated producing effluents with constant purification rate



Municipal plant of Podegradzie,
(Poland) 1000 m³/day

Bioreactors work independently.

In case of seasonal reduction of wastewater flow, reactors can be shut down during low season

Adaptability

- Resistant to atmospheric interferences
- Remote areas
- Reducing construction of collector networks



Meat processing plant Croatia



Bio-Wash

Fine atomized water is sprayed from the top:

- Control of **Foam** formation
- **Absorbs odors**, preventing the emission into the environment.

Anti-odor filters or additional substances are not necessary

Plant can be built nearby populated areas.



Industrial plant:
Nestlé-Novartis,
medical nutrients.
250 m³/day Worms
(Germany)

Luft und Lärm, Standard German for air quality and noise control



Water reuse – Drinking water production

Total purification obtained through the IMR process followed by:

1. Microfiltration to remove larger particles
2. Reverse osmosis to remove contaminants and inorganic impurities
3. Stabilization and sterilization with UV system to kill any remaining bacteria



Durst Maltery (Germany)

***Drinking water is
produced and
recycled***



**Municipal plant of Lehnin,
(Germany) 6000 m³/day**



**Industrial plant Valencia,
(Spain) 1300m³/day**

Cheese Factory in Croatia

60 m³/day



Cheese Factory in Austria

1200 m³/day

References

Name of client	Branch	Postal code	Location	Tank	m ³ /d	COO mg/l in	Cleaning	COO mg/l out limit/average
Sachsen Malz GmbH & Co.	Maltery	.01809	Heidenau	1 x 500	350	3.200	full	125/70
Emig AG	Municip.+Beverage	14797	Lehmin <i>Cattura rettangolare</i>	3 x 1300	750	5.000	full	75/60
				1 x 1300	400	5.000	full	75/55
Dorn & Timm GmbH & Co.KG	Beverage	15831	Diedersdorf	2 x 500	400	4.500	full	110/75
				1 x 500	700	5.000	full	110/55
Dairygen. Karstädt	Dairy	19357	Karstädt	1 x 800	600	4.000	partly	600
Nordmilch eG. Zweigbetrieb	Dairy	21762	Otterndorf	1 x 400	300	3.700	partly	600
Ostsee-Dairy GmbH	Dairy	23970	Wismar	2 x 600	320	5.900	partly	600
Flensb.Brewery E.Petersen	Brewery	24937	Flensburg	2 x 1000	1550	5.800	partly	600
Zentral-Dairy Aurich	Dairy	26605	Aurich	3 x 1000	600	4.500	partly	600
				1 x 1000	400	6.000	partly	600
Biolac GmbH	Dairy	31097	Harbansen	Belöftung	1300	4.500	partly	400
DMV	Dairy	31097	Harbansen	1x 1000	400	4.000	partly	300
Milchwerke Westfalen eG	Dairy	32046	Herford	2 x 900	1000	3.000	partly	700/600
Westmilch Milchunion eG	Dairy	34414	Warburg-Rimbeck	1 x 800	1000	4.500	partly	400
Dairyunion Kurhessen eG	Dairy	34537	Bad Wildungen	2 x 600	630	6.000	partly	600
Bärenbräu GmbH	Brewery	35745	Herborn	1 x 200	450	3.000	partly	500
Dairy Hünfeld-Niederjossa	Dairy	36088	Hünfeld	2 x 600	300	8.000	fully	110/55
DMV International	Food	37176	Nörten-Hardenbg.	1 x 300	250	13.000	partly	600
HarzDairy Wernigerode	Dairy	38855	Silstedt	1 x 500	300	6.000	partly	600
Milchhof Magdeburg GmbH	Dairy	39128	Magdeburg	1 x 1000	500	6.000	partly	600
Gemeinschaftsklärwerk	Municip.+Beverage	39359	Calvörde	3 x 1000	1300	3.000	full	75/65
IFF GmbH	Beverage	46446	Emmerich	1 x 600	350	8.000	partly	600
Milchwerke Münsterland eG	Dairy	48351	Everswinkel	1 x 300	600	6.000	partly	400
				1 x 600	650	7.000	partly	400
Privat Dairy Borgmann	Dairy	48632	Coesfeld	1 x 600	800	6.000	partly	600
Sanobub Produktions GmbH	Dairy	49509	Recke	1 x 300	200	8.000	partly	600
Adrett	Laundry	49808	Lingen	2 x 400	750	1.500	full	125/60
Maltery Wallertheim	Maltery	55578	Wallertheim	1 x 200	130	3.000	partly	400
Milchwerke Köln-Wuppertal	Dairy	58638	Iserlohn	1 x 800	550	4.400	partly	600
Satro Milchwerk eG	Dairy	59555	Lippstadt	2 x 600	480	8.000	partly	500

References

Rapp's Kelterei	Beverage	61184	Karben	1 x 250	200	8.000	partly	600
VMH Rosbach	Beverage	61191	Rosbach	2 x 650	960	1.700	partly	600/50
Glaabsbräu F. Glaab & Co.	Brewery	63500	Seligenstadt	1 x 300	400	4.500	partly	500
Eder's Family Brewery	Brewery	63757	Großostheim	1 x 1000	1300	5.200	partly	600
Durst Malz, Malzfabriken	Maltery	64579	Gernsheim	2 x 500	700	3.800	partly	600/200
				2 x 1000	300	3.200	Recycling	5
Schwälbchen Dairy	Dairy	65307	Bad Schwalbach	1 x 225	300	7.000	partly	400
Schill-Malz GmbH & Co.KG	Maltery	67550	Worms-Rheindörk	2 x 400	250	2.800	partly	600
Palatia Malz	Maltery	67757	Kreimbach-Kaulbach	3 x 800	600	3.800	full	100/60
EMIG Fruchtsaft GmbH	Beverage	74915	Waibstadt	3 x 800	680	4.800	full	75
Schloss Brewery Kaltenberg	Brewery	82269	Geltendorf	1 x 300	225	3.200	partly	600
Malzfabrik A. Müller	Maltery	84069	Inkhofen	3 x 500	800	2.000	full	95/45
Brewery Rapp KG	Brewery	86500	Kutzenhausen	3 x 800	1230	3.000	full	75/50
Dairy Gropper	Dairy	86657	Bissingen	1 x 500	600	4.500	partly	600
Brauhaus Dettingen GmbH	Municip.+Brewery	86732	Dettingen	3 x 1000	1200	3.000	full	90/55
Weißheimer Malzfabrik	Municip.+Maltery	86845	Großaitingen	2 x 500	450	2.500	full	110/60
				2 x 200	Puffer			
Malzfabrik Gebler	Municipality+Maltery	86853	Langerringen	3 x 800	700	2.500	full	75/60
Patrizier-Bräu AG	Brewery	90763	Fürth	2 x 600	1200	4.500	partly	600
Rovita GmbH	Dairy	93059	Regensburg	1 x 500	350	5.100	partly	600
Dairy Genossenschaft eG	Dairy	93413	Cham	1 x 100	600	4.500	partly	230
				2 x 500	600	4.500	partly	230
				2 x 1000	800	5.000	partly	230
Ostb.Milchwerke eG Passau	Municipality+Dairy	94060	Hartkirchen	2 x 500	350	4.000	full	110/55
Milchhof Albert	Dairy	96107	Scheßlitz	3 x 500	400	3.500	full	110/55
RhönGold-Dairy	Dairy	98634	Kaltensundheim	1 x 500	250	5.000	partly	600
Brewery Grieskirchen AG	Brewery	A-4710	Grieskirchen	1 x 170	170	4.500	partly	300
Lactoprot	Dairy	A-4910	Ried im Innkreis	1 x 1200	800	6.000	partly	300
Schärtinger Land Dairy	Dairy	A-5143	Feldkirchen	3 x 1000	1200	8.000	fully	110/70
Maishofen	Dairy	A-5751	Maishofen	1 x 500	300	7.200	partly	mixing
K. Deuring & Co.	Starch/sugar	A-6912	Hörbranz	2 x 800	500	10.000	full	75/70
Steirerbrau AG	Brewery	A-8021	Graz	1 x 1800	2000	1.800	partly	500/250
Berglandmilch Voitsberg	Dairy	A-8570	Voitsberg	3 x 1000	1200	2.000	full	75/55
Fromagerie MILVAL	Dairy	CH-2610	St. Imier	1 x 800	425	6.000	partly	500/420
Maltamanca S.A.	Maltery	E-20010	Albacete	1 x 800	400	2.500	partly	1000/700
Lacteos Martinez S.A.	Dairy	E-26200	Haro	1 x 250	120	5.000	partly	1000/900
Coca-Cola Colebega S.A.	Beverage	E-46930	Quart de Poblet	1 x 1200	1000	2.500	partly	1000/800
Podęgrozie	Municipality	PL-33386	Podęgrozie	2 x 1000	1000	700	full	75/50

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